

DEMOGRAPHIC MONITORING OF  
PENSTEMON LEMHIENSIS  
BEAVERHEAD NATIONAL FOREST  
1990 PROGRESS REPORT

by

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## I. INTRODUCTION

This report is an update to the status review and initial demographic monitoring report on Penstemon lemhiensis (Shelly 1990b), a sensitive plant species that occurs on the Beaverhead and Bitterroot National Forests in Montana. Additional field surveys were done in 1990 in June, July and August. These surveys located eight additional populations. The three demographic monitoring transects established in 1989 on the Beaverhead National Forest were measured in 1990.

## II. SPECIES INFORMATION

### A. REVIEW OF PRESENT STATUS

1. **FEDERAL STATUS:** Penstemon lemhiensis is currently in Category 2 of the U.S. Fish and Wildlife Service Notice of Review (U.S. Department of Interior 1990). Category 2 taxa are those "for which there is some evidence of vulnerability, but for which there are not enough data to support listing proposals at this time."

Penstemon lemhiensis is also currently on the U.S. Forest Service Region 1 sensitive species list (U.S. Department of Agriculture 1988; Reel et al. 1989). Sensitive species are "plant and animal species identified by the Regional Forester for which population viability is a concern, as evidenced by: a.) significant current or predicted downward trends in population numbers or density," and/or "b.) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution" (Reel et al. 1989). Through its inclusion on the Region 1 sensitive species list, P. lemhiensis has legal protection under U.S. Forest Service agency policies (W. Ruediger, pers. comm.).

2. **STATE STATUS:** In Montana, Penstemon lemhiensis is currently ranked as S2 ("imperiled in state because of rarity") by the Montana Natural Heritage Program (Shelly 1990a). It is also currently listed as "threatened" in a recent evaluation of rare plants in Montana (Lesica and Shelly 1991). A "threatened" species is one which is "likely to become endangered throughout all or a significant part of its range in Montana in the foreseeable future. Specific threats to known

populations of these plants have been identified" (Lesica and Shelly 1991). These state rankings do not currently provide any direct legal protection for P. lemhiensis.

#### B. UPDATE OF GEOGRAPHICAL DISTRIBUTION (MONTANA)

1. **BEAVERHEAD COUNTY:** Six new populations of Penstemon lemhiensis were located in Beaverhead County in 1990 which brings the total for the county to 36.
2. **RAVALLI COUNTY:** Two new populations of Penstemon lemhiensis were located in Ravalli County in 1990, bringing the total for the county to six.

The eight populations newly discovered in 1990 bring the total of known locations to 44. Element occurrence print-outs and maps of the new occurrences are in section V.

#### C. POPULATION MONITORING AND DEMOGRAPHIC STUDIES

1. **NEW POPULATIONS LOCATED IN 1990:** Details of population size for the eight newly discovered populations are in Table 1.
2. **DEMOGRAPHIC MONITORING TRANSECTS:** The three permanent monitoring transects established in 1989 were re-read on 1-2 August 1990 using the methods described in the previous report (Shelly 1990b). The population and fecundity data are summarized in Table 2.

The total number of plants on the three transects declined from 240 plants in 1989 to 221 plants in 1990, reflecting decreases in the French Creek - Park Mine and Badger Pass North transects. Total population size increased at the French Creek - Discovery Mine transect and decreased at the French Creek - Park Mine and Badger Pass North transects in 1990, although the decrease at the Badger Pass North transect was marginal.

The number of plants at the French Creek - Park Mine transect decreased by 27 plants for a population decrease of 31%. Extensive sheet erosion was noted at the site and was probably influential in the death of the 33 established plants that did not survive from 1989 to 1990. The fecundity and vigor of the French Creek - Park Mine population was reduced in 1990 and was the

**Table 1.** Penstemon lemhiensis populations newly discovered in 1990.

**BEAVERHEAD COUNTY**

Occurrence number: 038  
Site name: Kilns  
Size: 4 acres  
Population size and condition: 65 plants in undisturbed habitat.

Occurrence number: 039  
Site name: Frog Creek  
Size: <1 acre  
Population size and condition: 17 plants mostly in roadcut.

Occurrence number: 040  
Site name: Ermont Gulch  
Size: <1 acre  
Population size and condition: 2 flowering plants

Occurrence number: 041  
Site name: Bloody Dick Creek  
Size: <1 acre  
Population size and condition: 8 flowering plants.

Occurrence number: 042  
Site name: Bull Creek (Hairpin Ranch)  
Size: <1 acre  
Population size and condition: 12 flowering plants in disturbed road cut.

Occurrence number: 044  
Site name: Trapper Creek  
Size: <1 acre  
Population size and condition: 21 flowering plants; site degraded by livestock grazing and non-native species.

**RAVALLI COUNTY**

Occurrence number: 037  
Site name: Woods Creek  
Size: 2 acres  
Population size and condition: small population; 24 plants in 1990; site badly infested with spotted knapweed.

Occurrence number: 043  
Site name: Beaver Creek  
Size: 3 acres  
Population size and condition: 40 plants; population small, habitat in good condition.

**Table 2.** Population density and fecundity data for Penstemon lemhiensis in long-term monitoring transects, Beaverhead National Forest, 1989 and 1990.

TRANSECT	FRENCH CREEK- PARK MINE		FRENCH CREEK- DISCOVERY MINE		BADGER PASS NORTH	
	1989	1990	1989	1990	1989	1990
# plots/transect	25	25	25	25	50	50
# plants/transect	88	61	35	50	117	110
density (plants/m <sup>2</sup> )	3.5	2.4	1.4	1.8	2.3	2.2
# plants fruiting/transect	29	14	8	24	23	49
# fruits/transect	481	199	97	393	441	967
% plants fruiting	32.9	23.0	22.9	48.0	19.7	44.5
mean # fruits/fruiting plant	16.6	14.2	12.1	16.4	19.2	19.7
mean # fruits/inflorescence	11.2	8.0	8.1	9.1	13.8	9.3
% plants with 1 rosette	30.7	27.9	22.9	15.6	14.6	16.4
% plants with >1 rosette	64.8	60.7	77.1	62.2	74.4	73.6
% 1-rosette plants with fruit	11.1	5.9	0	42.9	11.8	16.7
% multi-rosette plants with fruit	45.6	35.1	29.6	75.0	24.1	56.8
% flowering stems browsed	23.2	4.0	47.8	23.3	3.0	2.9
% aborted flowers	N.R.	60.1	N.R.	70.0	52.4	67.4
mean # seeds/fruit ( $\pm$ s.d.)	32.7 $\pm$ 11.2	33.8 $\pm$ 8.9	34.0 $\pm$ 10.3	31.4 $\pm$ 8.4	36.0 $\pm$ 12.1	35.6 $\pm$ 12.7
# seedlings/transect	4	3	0	13	13	6
# established plants not surviving 1989-1990	--	33	--	2	--	12
# seedlings surviving 1989-1990	--	1 of 4	--	--	--	5 of 13
population growth rate	--	-31%	--	+42.9%	--	-6%

N.R. = not recorded in 1989.

lowest of the three transects as indicated by decreases in, for example, the number of plants fruiting, the number of fruits, the percentage of fruiting plants, the number of fruits per fruiting plant and inflorescence, and the percentage of plants with fruits (Table 2). The percentage of browsed stems was decreased.

The number of plants at the French Creek - Discovery Mine transect increased by 15 plants in 1990 for a 42.9% population growth rate. The death of two established plants in 1990 was offset by recruitment of 17 new plants in 1990. This population showed good fecundity and vigor as indicated by, for example, an increased number and percentage of plants fruiting, increased mean numbers of fruits per plant and per inflorescence (Table 2). Thirteen seedlings were recorded in 1990 as contrasted with none in 1989. The French Creek - Discovery Mine transect continued to have the highest rate of browsed stems probably by deer.

The number of plants at the Badger Pass North transect decreased by 7 plants in 1990 for 6% population decrease. Twelve established plants died between 1989 and 1990. Indicators of fecundity and vigor were mixed in this population. The number and percentage of fruiting plants and total number of fruits were greater while the mean number of fruits per inflorescence was lower and the mean number of fruits per fruiting plant was essentially unchanged (Table 2). Six seedlings were recorded in 1990 vs. 13 in 1989.

The mean number of seeds per fruit was essentially the same for all three transects and was little different from 1989. The percentage of aborted flowers was also similar for all three transects.

### 3. POPULATION MONITORING

Two previously documented populations were revisited in 1990. The Badger Pass site (005) in 1986 contained 190 plants, 75 of which were within an exclosure. In 1989, only 5-10 plants were seen and none were within the exclosure. In 1990, ca. 19 plants were seen outside the exclosure and 38 were seen within it (Heinze 1991). Most of the 38 plants within the exclosure were mature, probably multi-year, plants, nearly half of which (16) were flowering.

The Ermont Gulch site (014) contained 76 plants in 1986, 1 plant was seen in 1989, and 10 plants were seen in 1990 (Heinze 1990). The reasons for these apparent population fluctuations are not clear.

### III. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

- A. **THREATS TO NEWLY LOCATED POPULATIONS:** Six of the eight populations newly located in 1990 contain fewer than 25 plants. All but one of the populations is in a roadside or other disturbed site and nearly all contain non-native species. These populations are likely ephemeral in these sites. Because of their small size and likelihood of being affected by road maintenance activities or weed spraying, they are prone to extirpation.
- B. **MANAGEMENT RECOMMENDATIONS:** Four of the eight populations are on land managed by the Beaverhead and Bitterroot National Forests. One site is on land managed by the Bureau of Land Management, two populations are partly on BLM land and partly on privately owned land, and one site is entirely on land that is privately owned.

Management plans on the national forests should take known populations into account and prevent disturbance of these sites. To prevent inadvertent disturbance, U.S. Forest Service personnel should be provided with detailed information on the location of these Penstemon lemhiensis populations. This is particularly important for those involved in weed control and road maintenance activities.

The small size of the newly discovered populations is consistent with previous information on this species. The currently known locations were analyzed as to population size and whether the site was primarily in native or disturbed habitat (Table 3). The disturbed habitats are generally roadcuts or roadsides. Of the 44 recorded sites, two cannot be relocated; one site containing two subpopulations, one in disturbed habitat and one in native habitat was considered to be two populations. Thus, a total of 43 populations was used. The total number of plants from latest counts is about 2997; 2419 plants (81% of the total) occur in the 16 populations in native habitat. The 27 populations in disturbed habitats total 578 plants (19% of the total). Of populations with <50 plants, 23 populations, containing a total of 307 plants, occur in disturbed



**Table 3.** Numbers of populations and plants of Penstemon lemhiensis in disturbed and native habitats.

Popln Size	Disturbed Habitat		Native Habitat		Total	
	Poplns	Plants	Poplns	Plants	Poplns	Plants
1-10	10	36	1	10	11	37
11-20	6	91	1	17	7	108
21-30	6	146	0	0	6	146
31-40	1	34	1	40	2	74
41-50	0	0	0	0	0	0
51-100	4	271	4	236	8	507
>100	0	0	9	2116	9	2116
Total	27	568	16	2419	43	2997

habitats while three populations containing 67 plants occur in native habitats. Of populations with >50 plants, only four populations, containing 271 plants, occur in disturbed habitats while the 13 populations in native habitats contain the vast majority of plants (2352, 78% of the total population). Thus, in terms of the total population of Penstemon lemhiensis, the populations in native habitat are disproportionately important compared to the populations in disturbed habitats. The populations in disturbed habitats are generally small and vulnerable to extirpation due to stochastic population fluctuations, as well as management activities, such as road grading or weed spraying.

The population size distribution, coupled with a vulnerability to management activities, indicate that Penstemon lemhiensis should remain on the sensitive species list for Region 1 of the U.S. Forest Service.

#### C. PROPOSALS FOR FUTURE STUDIES

The following studies should be continued:

1. Demographic monitoring studies of the permanent transects should be continued and re-read in 1991.

2. Population monitoring should be continued, especially of populations that appear to have declined recently, such as Badger Pass (005), Red Butte (012), and Ermont Gulch (014).
3. Continue field surveys for new populations in areas of potential habitat.

## IV. LITERATURE CITED

- Heinze, D.H. 1990. Memo to Deputy State Director, 10 August 1990, subject: Report on searches for Lemhi beardtongue (Penstemon lemhiensis), Bureau of Land Management, Montana State Office, Billings. 5 pp.
- Heinze, D.H. 1991. Memo to Montana Natural Heritage Program, 28 March 1991, subject: Penstemon lemhiensis at Badger Pass and Ermont Gulch sites, Bureau of Land Management, Montana State Office, Billings. 8 pp.
- Lesica, P. and J.S. Shelly. 1991. Sensitive, threatened and endangered vascular plants of Montana. Montana Natural Heritage Program, Montana State Library, Helena.
- Reel, S., L. Schassberger, and W. Ruediger. 1989. Caring for Our Natural Community: Region 1 - Threatened, Endangered and Sensitive Species Program. U.S. Department of Agriculture, Forest Service, Wildlife and Fisheries, Missoula, Montana. 309 pp., appendices.
- Shelly, J.S. 1990a. Plant species of special concern. Montana Natural Heritage Program, Helena, Montana. 20 pp.
- Shelly, J.S. 1990b. Status review update and establishment of demographic monitoring studies: Penstemon lemhiensis. Report to U.S. Forest Service - Region 1, Beaverhead and Bitterroot National Forests, Montana. Montana Natural Heritage Program, Helena, 61 pp.
- U.S. Department of Interior. 1990. Endangered and threatened wildlife and plants; review of plant taxa for listing as endangered or threatened species; notice of review. Federal Register 50 CFR Part 17: 6184-6229.
- U.S. Department of Agriculture. 1988. Sensitive Plant Field Guide, Region 1. U.S. Forest Service, Northern Region, Range, Air, Watershed, and Ecology Section, Missoula, Montana.

**V. ELEMENT OCCURRENCE PRINT-OUTS AND MAPS**

Occurrence number: 037

Global rank: G3      Forest Service status: SENSITIVE LIST  
State rank: S2      Federal Status: C2

Survey site name: WOODS CREEK

EO rank: D

EO rank comments: SMALL POPULATION; HABITAT BADLY INFESTED  
WITH KNAPWEED.

County: RAVALLI

USGS quadrangle: PAINTED ROCKS LAKE (15)

Township-range: 003S022W    Section: 20      Precision: M

Township-range comments: NE4,21NW4

Survey date:	1990-07-30	Elevation:	5360
First observation:	1989	Slope/aspect:	20-30% / S
Last observation:	1990-07-30	Size (acres):	2

Location:

BITTERROOT MOUNTAINS, WEST FORK BITTERROOT DRAINAGE, WOODS CREEK; NORTH SIDE OF BITTERROOT NF ROAD #5669, 0.6 MILE WEST OF JUNCTION WITH ROAD #91 (WEST FORK ROAD).

Element occurrence data:

1989: 7 PLANTS COUNTED. 1990: 24 PLANTS COUNTED, 10 FRUITING AND 5 BASAL ROSETTES. SEVERAL PLANTS HAVE COLONIZED THE OPEN ROADBANK.

General site description:

GRAVELLY LOAM SOILS, DRY EXPOSURE, AGROPYRON SPICATUM GRASSLAND, PINUS PONDEROSA/PSEUDOTSUGA MENZIESII ECOTONE. ASSOCIATED SPECIES: CENTAUREA MACULOSA, BALSAMORHIZA SAGITTATA, ACHILLEA MILLEFOLIUM, ERIOGONUM UMBELLATUM, FESTUCA IDAHOENSIS, GILIA AGGREGATA, BERBERIS REPENS, FRASERA ALBICAULIS, PHACELIA HASTATA, APOCYNUM ANDROSAEMIFOLIUM, PHYSARIA GEYERI.

Land owner/manager:

BITTERROOT NATIONAL FOREST, WEST FORK RANGER DISTRICT

Comments:

POPULATION OBSERVED BY J.S. SHELLY, W. ALBERT, K. LACKSCHEWITZ AND K. MCBRIDE. POPULATION FIRST LOCATED BY W. ALBERT IN 1989.

Information source:

SHELLY, J. STEPHEN. US FOREST SERVICE/TNC, REGION 1 (RAWE), P.O. BOX 7669, MISSOULA, MT 59807.

Occurrence number: 038

Global rank: G3      Forest Service status: SENSITIVE LIST  
State rank: S2      Federal Status: C2

Survey site name: KILNS

EO rank: A

EO rank comments: GOOD POPULATION IN CURRENTLY UNDISTURBED  
HABITAT.

County: BEAVERHEAD

USGS quadrangle: CATTLE GULCH

Township-range: 002S010W    Section: 08      Precision: S

Township-range comments: NE4NW4

Survey date:	1990-06-29	Elevation:	7200
First observation:	1990	Slope/aspect:	35-45% / S
Last observation:	1990-06-29	Size (acres):	4

Location:

ABOVE CANYON CREEK KILNS CA. 9 MILES WEST OF MELROSE.

Element occurrence data:

CA. 65 PLANTS (29 JUNE 1990) IN FULL FLOWER.

General site description:

IN SLIGHTLY TALLER SAGEBRUSH STANDS WHERE SOILS ARE SOMEWHAT  
UNSTABLE AND TOTAL GRASS COVER IS LOW. ASSOCIATED SPECIES  
INCLUDE ARTEMISIA TRIDENTATA, CHRYSOTHAMNUS NAUSEOSUS, PHLOX  
LONGIFOLIA, ACHILLEA MILLEFOLIUM AND, SPARSELY, ARABIS  
FECUNDA.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, WISE RIVER RANGER DISTRICT

Comments:

THIS SITE IS DIRECTLY BELOW THE LOG RAMP AT THE TOP OF THE  
HILL ABOVE THE KILNS. IT IS LIKELY THAT AT ONE TIME  
VEGETATION WAS SCoured FROM THE HILLSIDE BY ROLLING LOGS.

Information source:

SCHASSBERGER, L. A. MONTANA NATURAL HERITAGE PROGRAM, 1515  
EAST 6TH AVE., HELENA, MT 59620. (390). 1990.

Occurrence number: 039

Global rank: G3      Forest Service status: SENSITIVE LIST  
State rank: S2      Federal Status: C2

Survey site name: FROG CREEK

EO rank:

EO rank comments:

County: BEAVERHEAD

USGS quadrangle: COYOTE CREEK

Township-range: 009S014W    Section: 21      Precision: S

Township-range comments: NE4SW4

Survey date:	1990-07-10	Elevation:	7200
First observation:	1990	Slope/aspect:	8-15% / S
Last observation:	1990-07-10	Size (acres):	0

Location:

CA. 1 AIR MILE NORTHWEST OF HORSE PRAIRIE GUARD STATION,  
ALONG FROG CREEK.

Element occurrence data:

17 GENETS; PLANTS MOSTLY BLOOMING OR BROWSED; FEW SEEDLINGS  
WERE OBSERVED.

General site description:

16 OF 17 PLANTS WERE ON A ROADCUT; ARTEMISIA TRIDENTATA/  
AGROPYRON SPICATUM COMMUNITY. ASSOCIATED SPECIES: PHLEUM  
ALPINUM, CASTILLEJA SP. (CORAL-COLORED), LUPINUS SP., SEDUM  
SP., POTENTILLA GRACILIS, ARTEMISIA TRIPARTITA, ACHILLEA  
MILLEFOLIUM, PENSTEMON ARIDIS.

Land owner/manager:

BLM: DILLON RESOURCE AREA, BUTTE DISTRICT  
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:

POTENTIAL THREATS INCLUDE ROAD MAINTENANCE, SPRAY, AND  
WILDFLOWER PICKERS.

Information source:

HEINZE, DON. BUREAU OF LAND MANAGEMENT, P.O. BOX 36800,  
BILLINGS, MT 59107-6800.

Occurrence number: 040

Global rank: G3      Forest Service status: SENSITIVE LIST  
State rank: S2      Federal Status: C2

Survey site name: ERMONT GULCH

EO rank: B

EO rank comments: POSSIBLE THREATS FROM GRAZING OR COMPETITION.

County: BEAVERHEAD

USGS quadrangle: ERMONT

Township-range: 006S011W Section: 27      Precision: S  
Township-range comments: SE4SW4

Survey date: 1990-06-28	Elevation: 6800
First observation: 1990	Slope/aspect: 8-15% / S
Last observation: 1990-06-28	Size (acres): 0

Location:

CA. 3.5 MILES WEST OF ARGENTA, JUST WEST OF FS ROAD #7467.

Element occurrence data:

2 BLOOMING PLANTS (28 JUNE 1990).

General site description:

ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS COMMUNITY, WITH  
PENSTEMON ARIDUS, P. WHIPPLEANUS, P. RADICOSUS, KOELERIA  
CRISTATA, TARAXACUM OFFICINALE, PSEUDOTSUGA MENZIESII,  
SENECIO SPP.

Land owner/manager:

BLM: DILLON RESOURCE AREA, BUTTE DISTRICT

Comments:

NON-BLOOMING PLANTS NOT SEARCHED FOR.

Information source:

HEINZE, DONALD. BUREAU OF LAND MANAGEMENT, P.O. BOX 36800,  
BILLINGS, MT 59107-6800.

Occurrence number: 041

Global rank: G3      Forest Service status: SENSITIVE LIST  
State rank: S2      Federal Status: C2

Survey site name: BLOODY DICK CREEK

EO rank: C

EO rank comments: SOME BROWSING; ROAD MAINTENANCE, WEED  
SPRAY, WILDFLOWER PICKING ALL POTENTIAL  
THREATS.

County: BEAVERHEAD

USGS quadrangle: KITTY CREEK

Township-range: 009S015W    Section: 23      Precision: S  
Township-range comments: SE4SE4

Survey date:	1990-08-08	Elevation:	6600
First observation:	1990	Slope/aspect:	3-8% / S
Last observation:	1990-08-08	Size (acres):	0

Location:

BEAVERHEAD MOUNTAINS, BLOODY DICK CREEK ROAD, CA. 0.75 MILE  
SOUTH OF DUTCH CREEK, AND CA. 0.5 MILE NORTH OF EAST  
PETERSON CREEK.

Element occurrence data:  
8 GENETS.

General site description:

ROADCUT; ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS COMMUNITY,  
WITH AGROPYRON SPICATUM, BALSAMORHIZA SAGITTATA, KOELERIA  
CRISTATA, PSEUDOTSUGA MENZIESII, SEDUM SP., MELILOTUS  
OFFICINALIS.

Land owner/manager:

BLM: DILLON RESOURCE AREA, BUTTE DISTRICT  
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:

IMMATURE PLANTS NOT SEARCHED FOR.

Information source:

HEINZE, DONALD. BUREAU OF LAND MANAGEMENT, 222 NORTH 32ND  
STREET, P.O. BOX 36800, BILLINGS, MT 59107-6800.



Occurrence number: 042

Global rank: G3      Forest Service status: SENSITIVE LIST  
State rank: S2      Federal Status: C2

Survey site name: BULL CREEK (HAIRPIN RANCH)  
EO rank: C  
EO rank comments: HIGHWAY MAINTENANCE, WEED SPRAY,  
WILDFLOWER PICKING ALL POTENTIAL  
THREATS.

County: BEAVERHEAD

USGS quadrangle: BUTCH HILL

Township-range: 006S014W    Section: 16      Precision: S  
Township-range comments: SE4NE4

Survey date:	1990-08-12	Elevation:	6700
First observation:	1990	Slope/aspect:	3-8% / SW
Last observation:	1990-08-12	Size (acres):	0

Location:

BULL CREEK, ALONG HIGHWAY 278, CA. 5 MILES WEST OF BIG HOLE  
PASS.

Element occurrence data:

12 PLANTS IN FLOWER (12 AUGUST 1990).

General site description:

DISTURBED AREA (ROAD CUT), WITH ARTEMISIA TRIDENTATA, BROMUS  
TECTORUM, AGROPYRON CANINUM, PHLEUM ALPINUM, LUPINUS SPP.,  
ACHILLEA MILLEFOLIUM, STIPA VIRIDULA, ARTEMISIA FRIGIDA,  
SEDUM SPP., FESTUCA IDAHOENSIS, ERIGERON SPP., AND MELILOTUS  
OFFICINALIS.

Land owner/manager:

PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:

ONLY PLANTS IN FLOWER WERE NOTED.

Information source:

HEINZE, DONALD. BUREAU OF LAND MANAGEMENT, 222 NORTH 32ND  
STREET, P.O. BOX 36800, BILLINGS, MT 59107-6800.

Occurrence number: 043

Global rank: G3      Forest Service status: SENSITIVE LIST  
State rank: S2      Federal Status: C2

Survey site name: BEAVER CREEK  
EO rank: C  
EO rank comments: HABITAT IN GOOD CONDITION, BUT  
POPULATION FAIRLY SMALL.

County: RAVALLI

USGS quadrangle: PAINTED ROCKS LAKE (15)

Township-range: 004S022W    Section: 06      Precision: S  
Township-range comments: NW4

Survey date:	1990-07-30	Elevation:	6240
First observation:	1990	Slope/aspect:	30%+ / SE
Last observation:	1990-07-30	Size (acres):	3

Location:

BITTERROOT MOUNTAINS, WEST FORK BITTERROOT RIVER DRAINAGE,  
BEAVER CREEK; ALONG BITTERROOT NF ROAD #91, 2.6 MILES WEST  
OF JUNCTION WITH SHEEP CREEK ROAD, AND CA. 2 AIR MILES  
NORTHEAST OF HORSE CREEK PASS.

Element occurrence data:

40 PLANTS COUNTED; FRUITING ON DATE OF SURVEY. POPULATION IS  
BISECTED BY THE ROAD, BUT THE HABITAT ABOVE AND BELOW THE  
ROAD IS IN VERY GOOD CONDITION. NO SIGNS OF GRAZING; SOME  
PLANTS HAVE COLONIZED THE ROADBANK.

General site description:

AGROPYRON SPICATUM/FESTUCA IDAHOENSIS GRASSLAND, PSEUDOTSUGA  
MENZIESII FOREST ZONE; STEEP, SOUTHEAST-FACING SLOPE, IN  
GRAVELLY LOAM SOILS, WITH BALSAMORHIZA SAGITTATA, ERIOGONUM  
UMBELLATUM, CENTAUREA MACULOSA, HIERACIUM CYNOGLOSSOIDES,  
LITHOSPERMUM RUDERALE.

Land owner/manager:

BITTERROOT NATIONAL FOREST, WEST FORK RANGER DISTRICT

Comments:

SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED. SITE SURVEYED  
BY J.S. SHELLY, K. LACKSCHEWITZ, W. ALBERT, AND K. MCBRIDE.

Information source:

SHELLY, J. STEPHEN. US FOREST SERVICE/TNC, REGION 1 (RAWE),  
P.O. BOX 7669, MISSOULA, MT 59807.

Occurrence number: 044

Global rank: G3      Forest Service status: SENSITIVE LIST  
State rank: S2      Federal Status: C2

Survey site name: TRAPPER CREEK  
EO rank: C  
EO rank comments: DEGRADED BY LIVESTOCK GRAZING; CAR  
TRAILS THROUGH AREA.

County: BEAVERHEAD

USGS quadrangle: CATTLE GULCH

Township-range: 002S010W    Section: 21      Precision: S  
Township-range comments: SW4SW4NE4

Survey date:	1990-06-28	Elevation:	6060
First observation:	1990	Slope/aspect:	3-8% / S
Last observation:	1990-06-28	Size (acres):	

Location:

TRAPPER CREEK, CA. 6.25 AIR MILES WNW OF MELROSE. FROM  
JUNCTION OF CANYON CREEK ROAD AND TRAPPER CREEK ROAD, TAKE  
THE LATTER 3.2 MILES TO CATTLE GUARD. TAKE OLD ROAD DOWN  
TOWARDS CREEK CA. 30 METERS TO SITE.

Element occurrence data:

21 FLOWERING PLANTS; SMALL, REMOTE POPULATION; MAY BE  
EPHEMERAL.

General site description:

SAGEBRUSH GRASSLAND AT THE EDGE OF ASPENS ALONG CREEK, WITH  
POA PRATENSIS, ARTEMISIA TRIDENTATA, LUPINUS SERICEUS,  
PENSTEMON ARIDUS.

Land owner/manager:

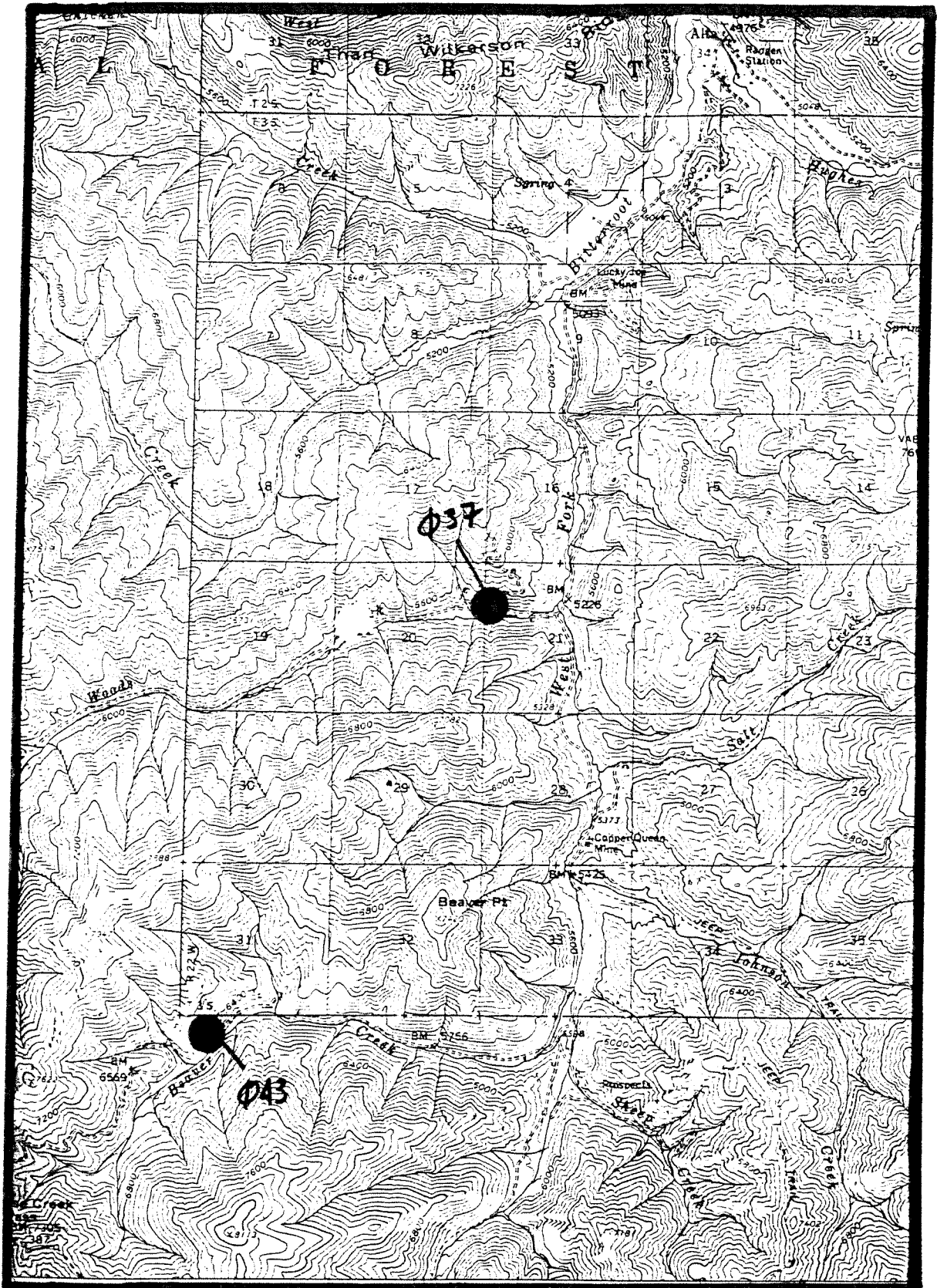
BEAVERHEAD NATIONAL FOREST, WISE RIVER RANGER DISTRICT

Comments:

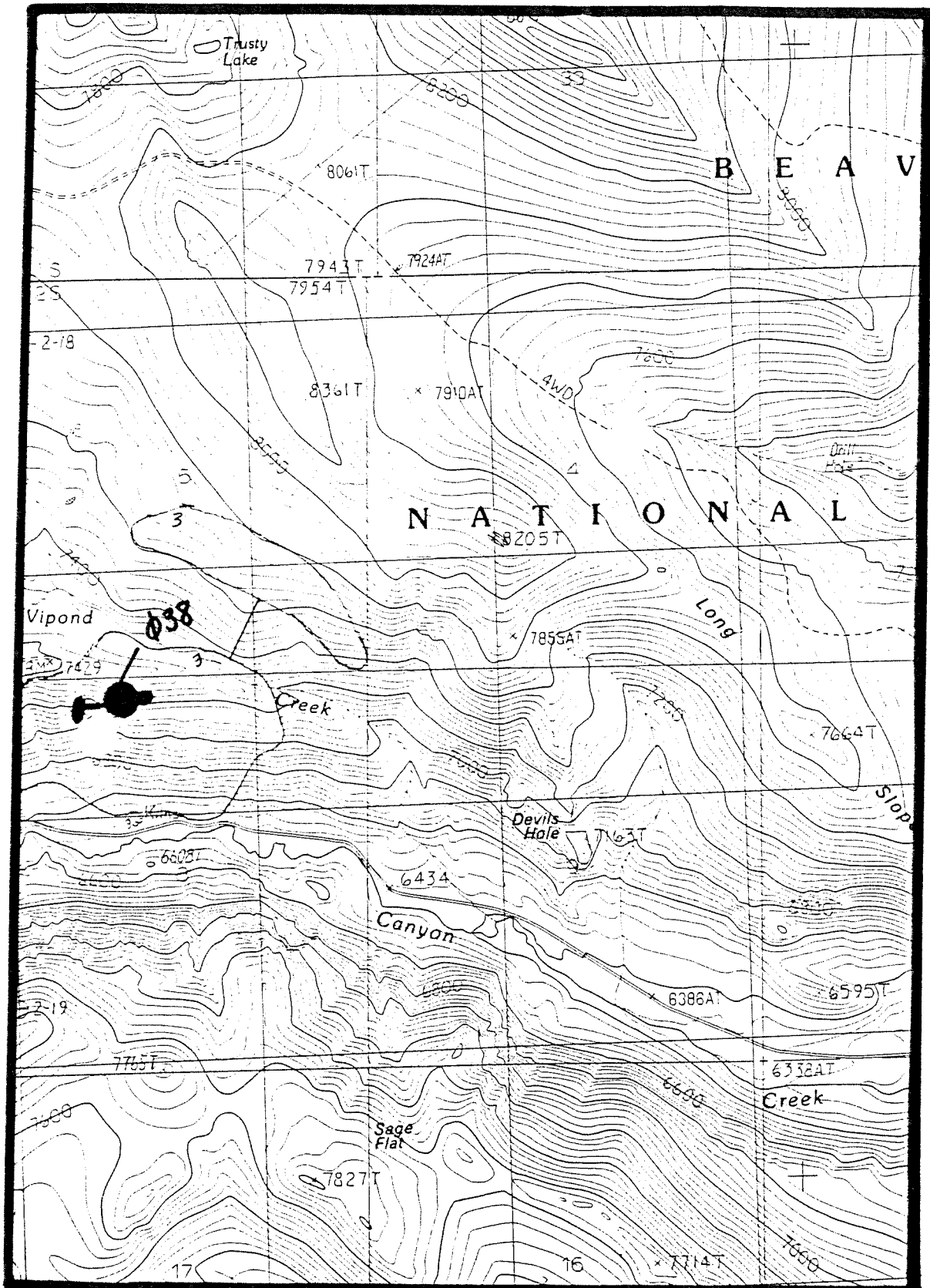
NONE.

Information source:

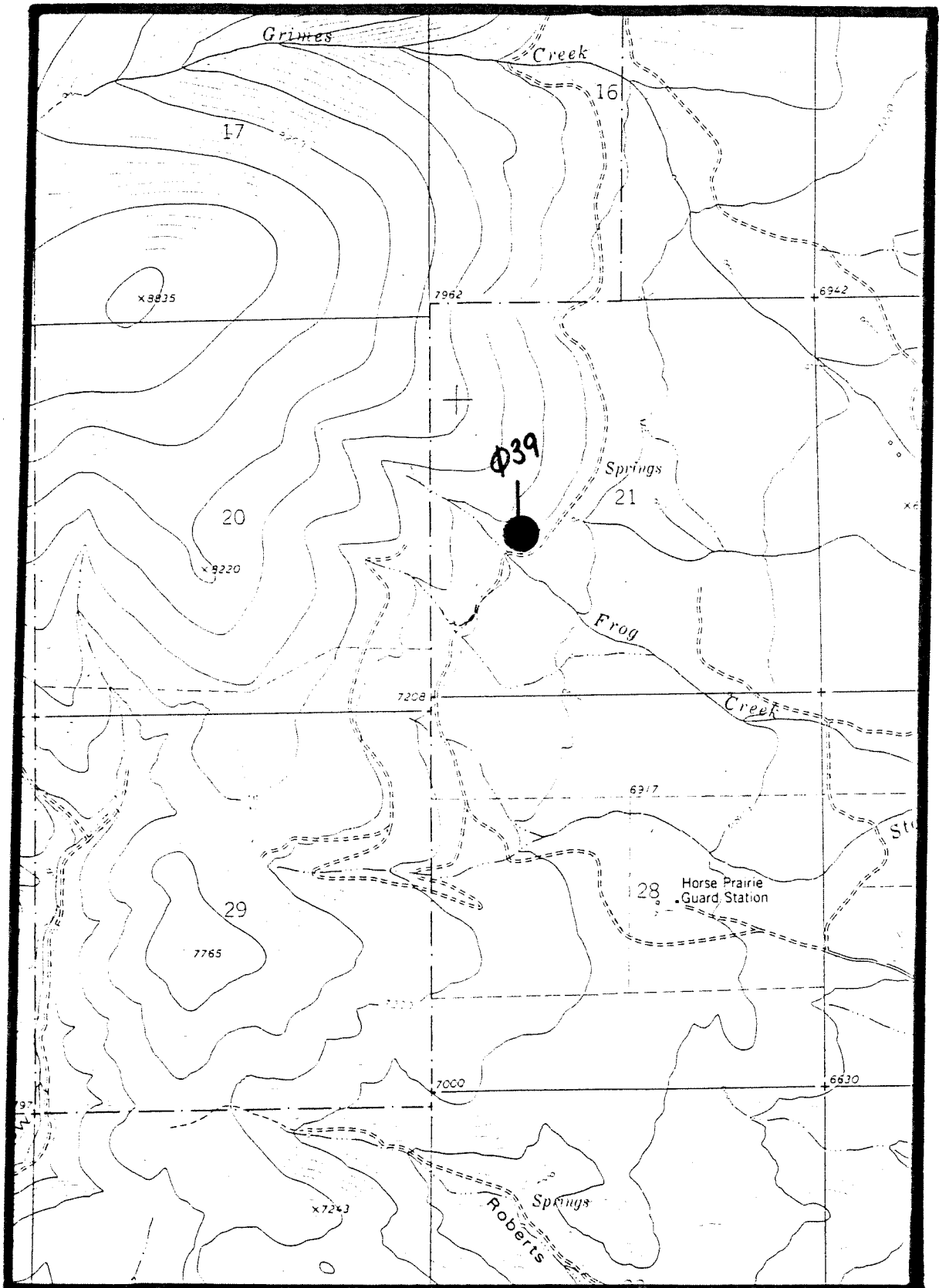
LESICA, P. DIVISION OF BIOLOGICAL SCIENCES, UNIVERSITY OF  
MONTANA, MISSOULA, MT 59812.



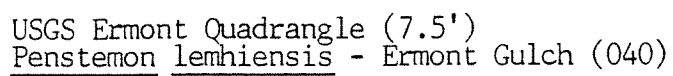
USGS Painted Rocks Lake Quadrangle (15')  
Penstemon lemhiensis - Woods Creek (037)  
- Beaver Creek (043)



USGS Cattle Gulch Quadrangle (7.5')  
Penstemon lemhiensis - Kilns (038)

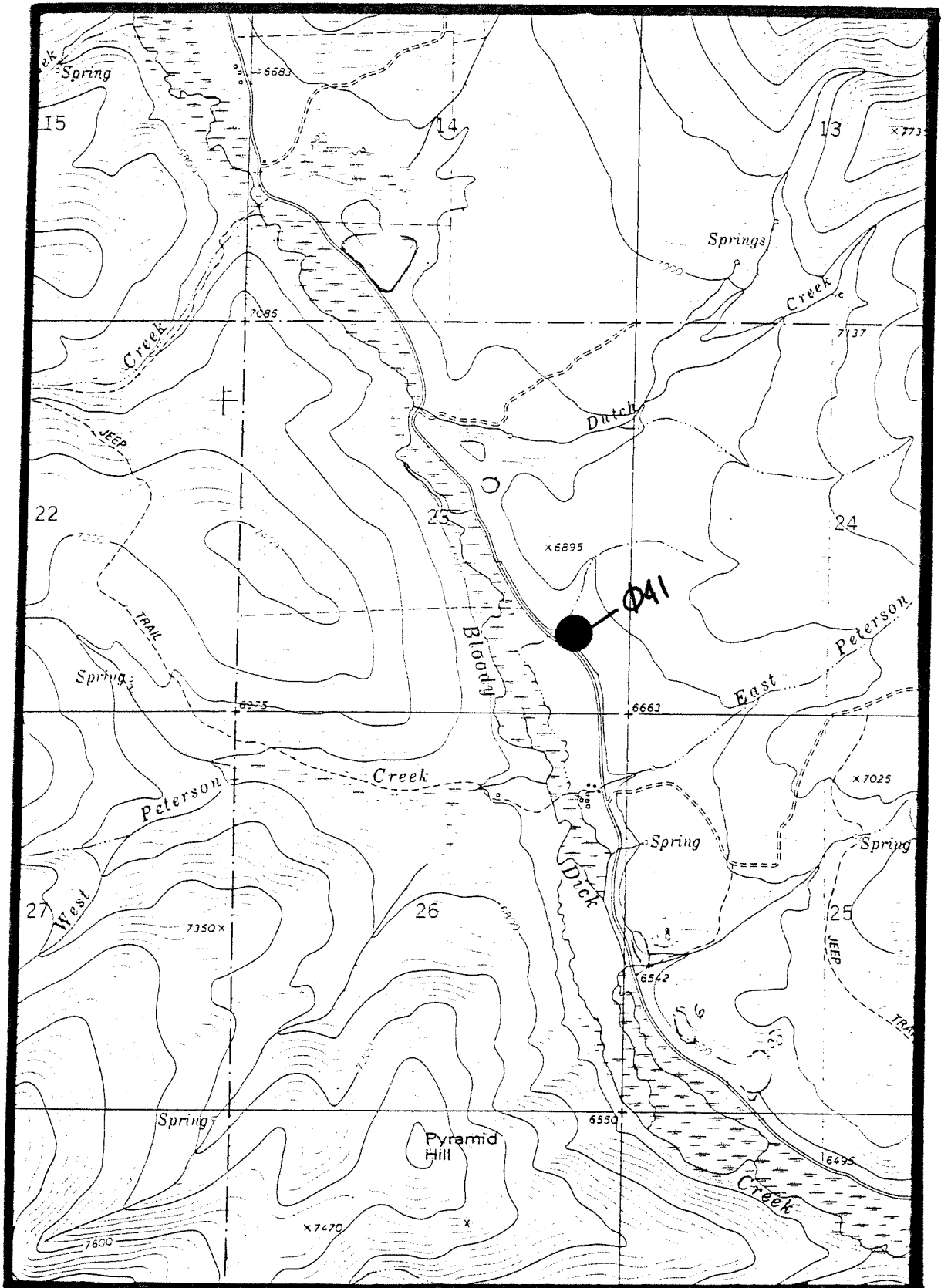


USGS Coyote Creek Quadrangle (7.5')  
Penstemon lemhiensis - Frog Creek (039)



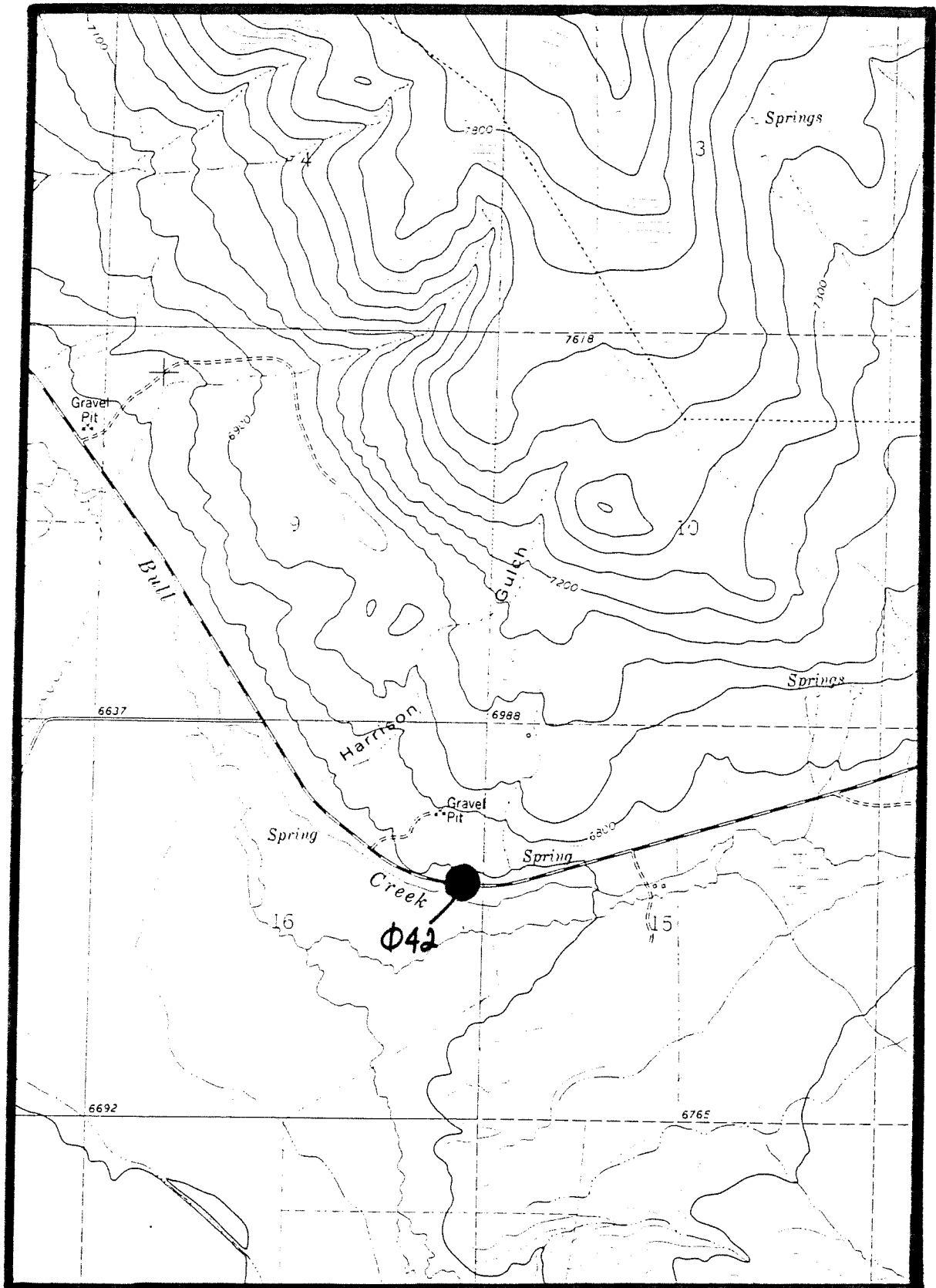
USGS Ermont Quadrangle (7.5')

Penstemon lemhiensis - Ermont Gulch (040)

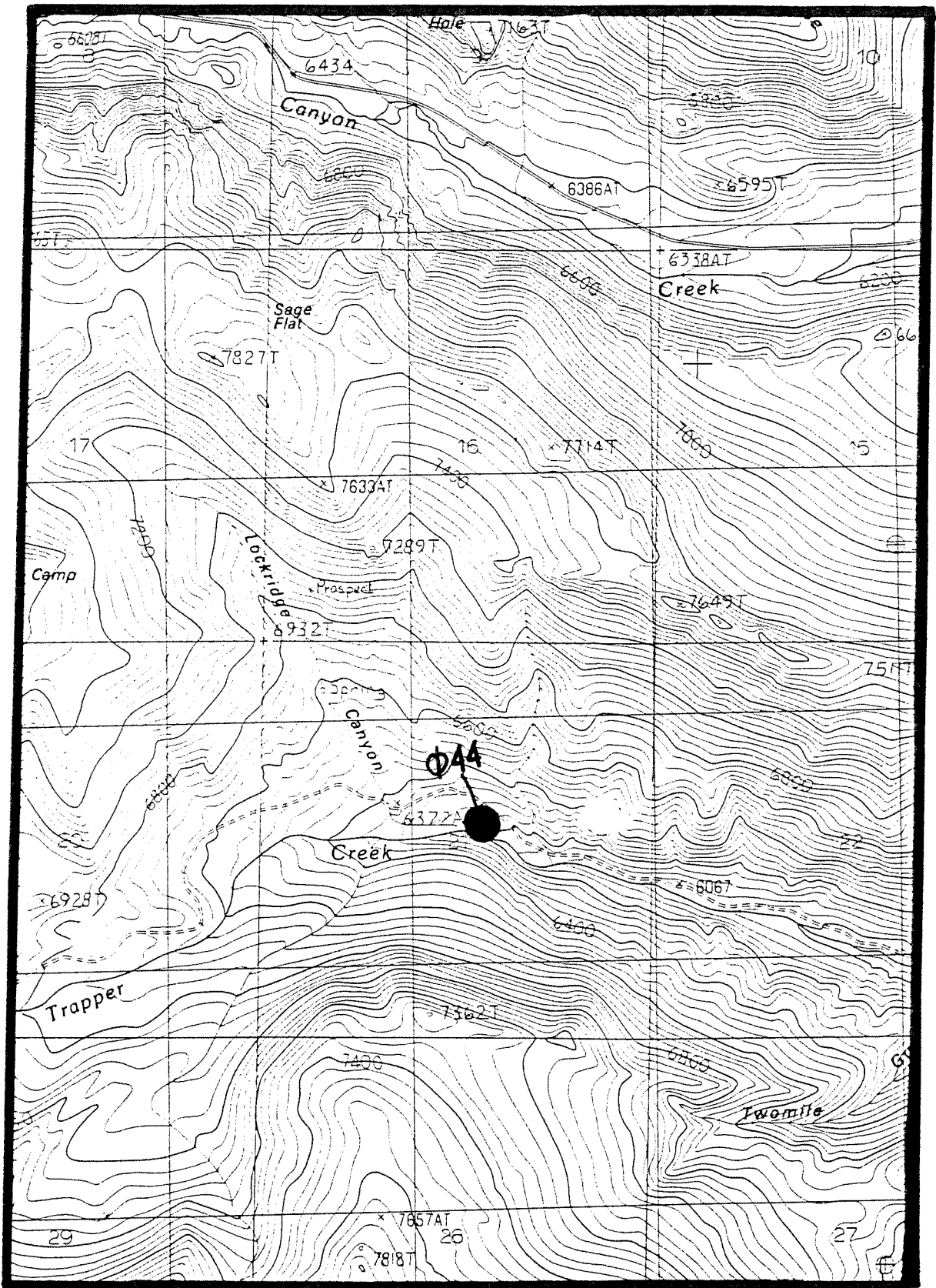


USGS Kitty Creek Quadrangle (7.5')  
Penstemon lemhiensis - Bloody Dick Creek (041)

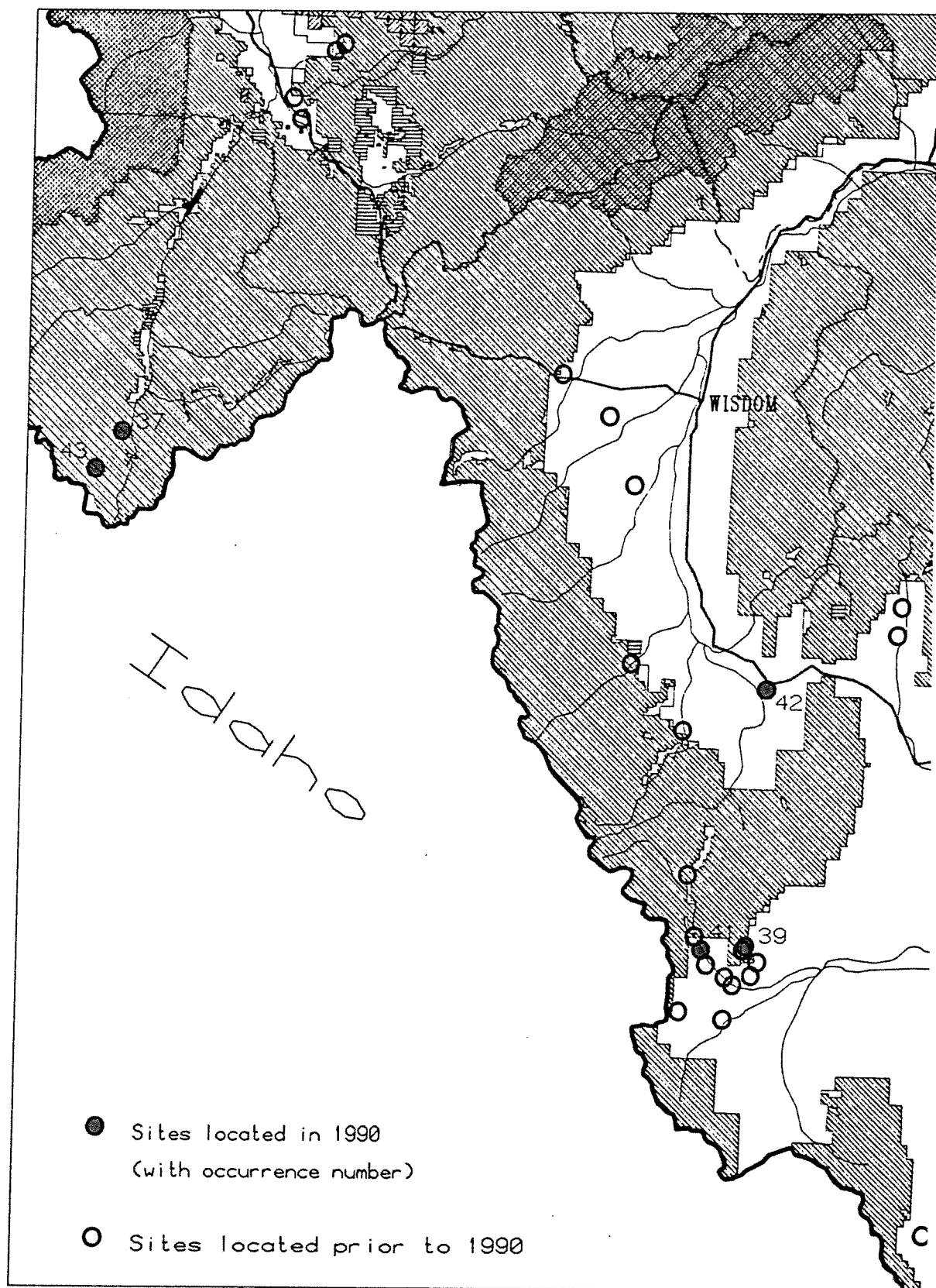




USGS Butch Hill Quadrangle (7.5')  
Penstemon lemhiensis - Bull Creek (Hairpin Ranch) (042)

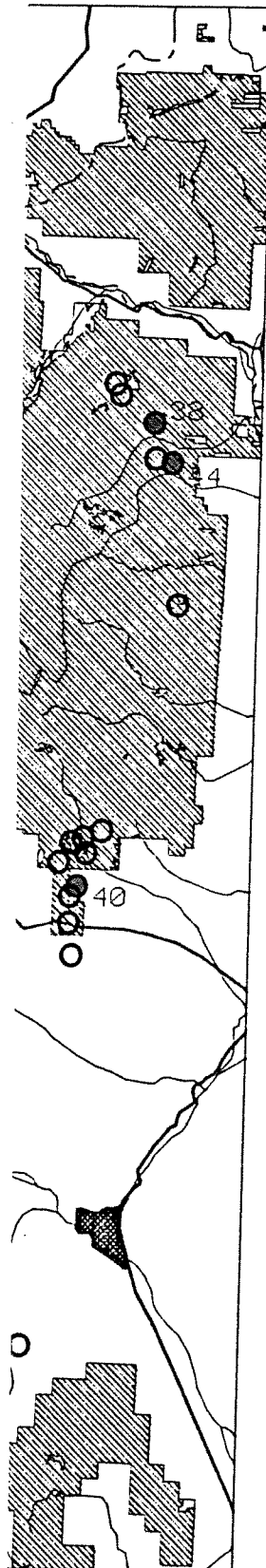


USGS Cattle Gulch Quadrangle (7.5')  
Penstemon lemhiensis - Trapper Creek (044)



# Penstemon lemhiensis

## Sites in Montana



-  National Forest
-  Wilderness
-  Adjacent Forest
-  Adjacent Wilderness
-  State Land
-  Corporate Land
-  Lake
-  City
-  Stream
-  Highway



Miles

Scale = 1:700,000

Montana Natural Heritage Program

March 15, 1991



State of Montana  
Natural Resource Information System

## VI. APPENDIX - DEMOGRAPHIC TRANSECT DATA

These data show the performance of individual Penstemon lemhiensis plants in permanent monitoring transects in 1989 and 1990. The following codes are used:

- A - aborted flowers (no fruit development apparent)
- B - browsed flowering stem
- C - established immature plants (rosette with  $\leq 4$  leaves)
- D - dead
- F - fruit
- I - inflorescence (flowering stem)
- P - predated fruit
- R - rosette (basal tuft of leaves on mature plant)
- S - seedlings (cotyledons evident or rosette  $< 15$  mm in diameter).

The codes form a formula describing the state of each plant. For example, R5-I2-F17-A25 is a plant with 5 basal rosettes, 2 inflorescences, 17 fruits, and 25 aborted flowers.

## FRENCH CREEK - PARK MINE

PLOT	PLANT	1989	1990
1	a	R2	C2
	b	R1	R2
	c	R1	R4-B1
	d	R3-I1-F7	R1
	e	--	D
2		no plants	no plants
3	a	R1	R2
	b	R1	R2
	c	S	D
	d	R1	R1
	e	R1	D
	f	R1-I1-F2	D (unearthed by erosion)
	g	R1	R2
4	a	S	D
	b	R1	R3
	c	R3	D
	d	R1	D
	e	R2	R1
	f	<del>R</del> --	R2
5	a	R2	D
	b	R1	D
6	a	R4	R1 (partly unearthed)

	b	R1	D
	c	S	D
	d	R1-I1-F2	D
	e	--	S
7	a	R1	D
	b	R1	D
	c	R1	D
	d	R1	R2
8	a	S	C
	b	R2	D
	c	R1	R1 (poor shape)
9	a	R3-I2-F5	D
	b	R6	R3
	c	R10-I1-F11	D
10	a	R10-I4-F35-B1	D
	b	R3-I1-F11	D
	c	R3-I3-F13	D
	d	R3	D
	e	R2	R1
	f	R1	R1
	g	R5-I1-F6	D
	h	R1	R3
	i	R1	D
	j	R8-I2-F31	R1
11	a	R6-I1-F5	D
	b	R2	R2
	c	R6	D
	d	R3	D
	e	R8-I1-F20-B1	D
	f	R1	R1
	g	R12-I1-F18	R6-I3-F8-P4-A8
	h	R4-I2-F19	D
12	a	R2-I2-F35	D
	b	R4	R3-I2-F4-P1-A24
	c	R4-I2-F39	R1
	d	R5-I1-F13	R3
	e	R3-I1-F7	D (buried)
13	a	R7-I2-F17	D
14	a	R2	D
	b	R5-I1-F12	D
15	a	R5	R4-I2-F11-A28
	b	--	S

16	a	R7-I2-F22	R3-I2-F5-A11
17	a	R1 (dying)	R3 (poor shape)
	b	R3	D
	c	R2-I1-F7	D
	d	R5	R2-I1-F2-A6
18	a	R5-I1-F16	R3
	b	R7-I3-F29	R3
	c	R3	R3
	d	--	S (may be <u>P. radicosus</u> )
19	a	R7	R5-I1-F15-A12
	b	R5	R5-I2-F16-A16
	c	R4-I1-F21	R1-I1-F1-A8
	d	R4	R4-I1-F7-A12
	e	R10-I1-F13-B5	R13-I4-F60-A108
	f	R8-I4-F61	R6-I2-F48-A29
	g	--	R1
20	a	R4-B1	R6
21	a	--	R2
22	a	R2	R1
	b	R4	R3
	c	--	R2
23	a	R1	D
	b	R6-B1-F1	R5
	c	R1-I1-F3	C2
	d	R1	R2
	e	R3	R1
	f	R4-B1	R4-I1-F3-P1-A12
	g	R3	R1
	h	--	C2
	i	--	R2
24		no plants	no plants
25	a	R1	R1
	b	R11	R7-I2-F13-A20
	c	R7-B1	R4-I1-F6-A6
	d	R9-B2	R7
	e	R3	R1
	f	--	R3

## FRENCH CREEK - DISCOVERY MINE

PLOT PLANT		1989	1990
1	a	R4-B3	R5-I2-F24-A40
	b	R3-B2	R1-I1-F7-A24
	c	R3	R3-I1-F3-A19
	d	R3	R4-I1-F9-A37
	e	R2	R3-B1-A3
	f	R4-B1	R4-I1-F9-A28
	g	R2	R2-I2-F13-A41
	h	R1	R2
	i	R8-B2	R4-I1-F6-A9-B1-F3-A11
	j	R1	R2-F2-A7-B1
	k	R2	R3-I1-F5-A21
	l	R1	R1-I1-F10-A21
	m	R4-B2-F2	R6-I2-F21-A55-B3
	n	R1	R3-I2-F29-A54
	o	R2	D
	p	R4-B1	R5-I3-F32-A72
	q	--	S1
	r	--	R1
	s	--	S1
2	a	R1	R3
	b	R6-B4	R8-I1-F4-A14
	c	R6-I1-F1	R4-I3-F23-A51-B1
	d	--	C1
	e	--	C1
	f	--	S1
3-5		no plants	no plants
6	a	R4-B1	R11-I1-F5-A37
	b	R4-I1-F6	R6
	c	--	S1
	d	--	S3
	e	--	S2
7	a	R1	R5
	b	R2-I1-F20	R1
	c	R1	R1
	d	R5-B1-F1	R4-I1-F5-A12
	e	--	R1
	f	--	S1
	g	--	S1
	h	--	S1
8		no plants	no plants
9	a	R6-I4-F7-B2	R1-I6-F75-A213-B1-F1-A16



10-15		no plants	no plants
16	a	R4	R2-I1-F5-A12
	b	R8-I4-F29	D
17-22		no plants	no plants
23	a	R3-I1-F31	R2-I3-F18-A26-B1
24	a	R4	R4-I2-F24-A11
25	a	R2	R2 (low vigor)
	b	R3	R3-I1-F10-A14
	c	R5	R3-I3-F29-A31
	d	R1	R2
	e	R5-B1	R6-I3-F21-A28-B1-A11
	f	--	S

## BADGER PASS NORTH

PLOT PLANT		1989	1990
1	a	R3	R4-I1-F15-A9
	b	R6-I2-F17-A64 (unknown if the 64 "aborted" fruits may develop)	R1
	c	R1	D
	d	S9 (center @ 2.5/2.5)	C4, S5(D)
	e	R3-I1-F11-A11	D
	f	R3	R1-I1-F1-A15
	g	R3	R3-I1-F11-A25
	h	S	D
	i	R5	R1-I1-F16-A20
	j	R6	R8
	k	--	S
2	a	S	C
	b	S	S(D)
	c	S	S(D)
	d	R2	R1
	e	R5	R1
	f	R2	D
	g	R2	R1-I1-F0-A14
	h	R2	D
	i	R1	R3-I1-F4-A20
	j	R2	D
	k	C	R1
	l	R2	R4
	m	C	R3
	n	R8	R4-I3-F0-A78
	o	--	S
3	a	R2	R3-I1-F4-A19
	b	R7	R5
	c	R1	R1
	d	R5-I1-F8-A19	R5
	e	R5-I2-F17-A25	R7-I4-F17-A36
	f	--	S
4-27		no plants	no plants
28	a	R7-I3-F27-A15	R6-I2-F29-A29
	b	R3	R4
29	a	R2	R2-I1-F14-A20
30	a	R4-I1-F3-A23	R4
	b	R2	R2

31	a	R3-I1-F8-A16	R3
	b	R7-I1-F23-A11	R11-I3-F45-A46
	c	C	R1
	d	R5-I1-F27-A10	D
32		no plants	no plants
33	a	R3-I1-F9-A6-B1	R8-I1-F27-A10
34		no plants	no plants
35	a	R1	R2
	b	R5	R11-I2-F44-A13-B1
36	a	R8	R14-I1-F11-A8
	b	R2	R2
	c	C	R2
	d	R7 (taproot unearthed)	R10
37	a	R3	R2
	b	R3	R4-I2-F15-A25
	c	R6	R5-I1-F32-A11
	d	R3	R7-I2-F25-A16
	e	R7	R7
	f	R3	R5
	g	R6	R5
	h	--	S
38	a	R1	R1
	b	R9	R5-I2-F1-A90
	c	R1	R1
	d	R6	R5-I2-F9-A51
	e	R4	R2
	f	R4	R4-I4-F39-A35
	g	R11	R7
	h	R9-I1-F12-A12	R9-I4-F21-A88
	i	--	R2-I2-F0-A41
39	a	R6	R3
	b	R2	D
	c	R1	R2
	d	R2	R4-B1
	e	R3	R3-I1-F2-A5
	f	R3	R5-I3-F20-A115
	g	R1-I1-F14-A22	R3
	h	R5+	R3-I1-F0
	i	R2	R4-I3-F8-A40
	j	R5-I2-F16-A64	D
	k	R1-I1-F13-A17	R4-I1-F16-A22
	l	R7-I1-F29-A12	R7
	m	R6	R7-I1-F33-A23
	n	R6	R2-I2-F20-A31

	o	--	R2-I1-F9-A14
40	a	R1	R8-I1-F7-A35
	b	R2-I1-F0-A34	R3
	c	R5-I1-F18-A15	R1
	d	R4	R3-I3-F3-A90
	e	R5	D
	f	R3	R1-I1-F0-A35
	g	R1	D
	h	R4-I2-F11-A15	D
	i	R6-I2-F31-A16	D
	j	R5	R1-I1-F7-A22
	k	R13	R13-I4-F16-A70
	l	R6	R9-I4-F19-A127
	m	R2	R1
	n	R5	R7-I3-F14-A72
	o	R5	R3-I2-F5-A29-B1
	p	R3	R1-I1-F0-A18
	q	R2	R2-I1-F4-A15
	r	--	R2-I1-F1-A40
	s	--	R1
41	a	R3	R6-I1-F25-A8
	b	R4-I1-F25-A27	R12-I2-F89-A22
	c	R4	R6
	d	R15±	R10-I5-F11-A129
	e	R16	R23-I3-F62-A33
	f	(part of d)	R5-I1-F5-A34
	g	--	S1
	h	--	S1
42	a	R4	R4-I2-F37-A49
	b	R5-I2-F41-A20	R11-I1-F23-A7
43	a	R8	R2
	b	R1	R4
	c	R6-I1-F29-A3	R5-I2-F9-A55
	d	R9-I2-F30-A18	R3-I3-F47-A43
	e	R4	R5-I1-F15-A10
	f	(part of a)	R4-I1-F13-A33
44	a	R10	R11-I2-F19-A15
	b	R8	R3
45	a	--	R1
46-47		no plants	no plants
48	a	R1	R3
	b	R2	R3
	c	R8-I1-F22-A10	R8-I3-F48-A36

49                      no plants

no plants

50      a                      R4

R3